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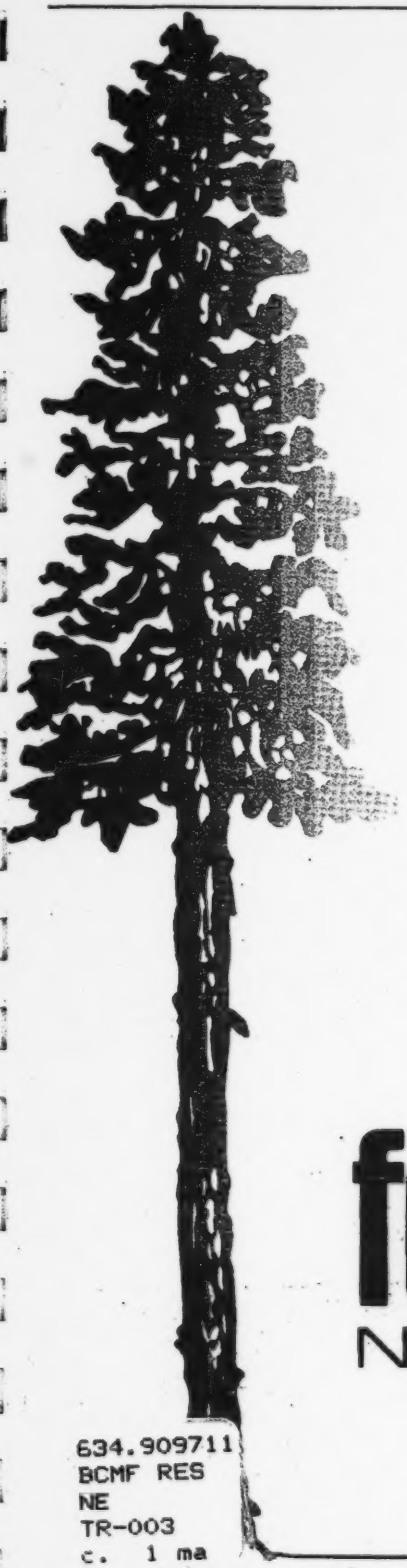

Ecosection Summaries For The Kootenay-Boundary Region[1]

H. J. Quesnel PhD PAg RPBio[2]
and
F. N. Thiessen RPF

Technical Report TR-003

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Ministry of Forests
518 Lake Street
Nelson, B.C.
V1L 4C6

December, 1993

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[1]The region includes areas evaluated by the Kootenay Regional Protected Areas Team. The boundary corresponds to the Nelson Forest Region and includes provincial parks, national parks, and other areas not in the Ministry of Forests' administrative area. The region includes the Kootenay Region and the southeast portion of the Southern Interior Region, Ministry of Environment, Lands and Parks.

[2]Regional contact for this document.

SUMMARY

Biophysical and recreational features are described for 14 ecosections that occur partially or completely in the Kootenay-Boundary Region of southeastern British Columbia. These ecosections are part of seven ecoregions and two ecoprovinces. Biophysical descriptions summarize bedrock geology, landforms, and climate; common elevational sequences of biogeoclimatic zones; and wildlife species associated with different vegetation zones or specific habitats that occur within or between zones. Recreational descriptions highlight major outdoor activities and additional physiographic features of interest to people.

ACKNOWLEDGEMENTS

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Special thanks to Sylvia Jongejan, Ministry of Forests, Nelson, for producing the map enclosed in the back pouch of this document.

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INTRODUCTION

On May 6, 1992, the government of British Columbia announced the development and implementation of a Protected Areas Strategy (PAS) for the province. PAS is to combine several conservation initiatives including Parks and Wilderness for the 90's and the Old-Growth Strategy. As part of this process, a Regional Protected Areas Team (RPAT) was formed in Nelson for the Kootenay-Boundary Region. The RPAT is responsible for evaluating the conservational, recreational, and cultural heritage values for the region. The framework for evaluating these resources was the biogeoclimatic subzone/variants within ecosections. Ecosections address the geographic distribution of ecosystems. It is the appropriate system for evaluating mobile species with extensive ranges. Further refinement within ecosections is achieved by using the biogeoclimatic system. The latter system addresses the elevational distribution of ecosystems; it incorporates slope, aspect, and vegetation differences within ecosections; and it is the appropriate system for evaluating species with limited mobility or ranges. Biogeoclimatic units are described in Braumandl and Curran (1992). This report describes the biophysical and recreational features for ecosections found in the Kootenay-Boundary Region.

The Ecoregion Classification System for British Columbia, including definitions and maps, is described in Demarchi (1993) and Demarchi *et al.* (1990). Demarchi (1993) provides the following definitions:

> "**Ecoprovinces** - are areas of consistent climate or oceanography, and physiography. They are useful for subcontinental-, national- or provincial-overview planning. There are 10 for the province (of British Columbia), nine terrestrial and one marine.
>
> **Ecoregions** - are areas with major physiographic, minor microclimatic or oceanographic differences within each ecoprovince. Ecoregions can be used to group biogeoclimatic or marine zones for the determination of historical and potential distribution of vegetation and wildlife. As such they are useful in provincial level planning. There are 43 ecoregions in British Columbia.
>
> **Ecosections** - are areas with minor physiographic, climatic and oceanographic differences. Each ecosection has a unique sequence of biogeoclimatic sub-zones and marine zones. This level in the hierarchy is useful for regional resource planning. There are 110 ecosections in British Columbia, 10 that are mainly marine, another 18 have both marine and terrestrial ecosystems, and 82 are strictly terrestrial."

Information for the Kootenay-Boundary Region was compiled from several sources (see references at the end of the document). The Kootenay-Boundary Region covers parts of two ecoprovinces: the Southern Interior Mountains and the Southern Interior (Demarchi 1993; Demarchi *et al.* 1990; Demarchi and Lewis 1992). The majority of the region lies within the former ecoprovince. The latter ecoprovince occurs as a minor area in the southwest corner of the Kootenay-Boundary Region. A map indicating location of units in the Kootenay-Boundary Region is included in the back pouch of this report.

The following summaries are organized by ecoprovince, ecoregion, and ecosections. The descriptions include broad physical features, general sequences of biogeoclimatic zones, common animal species associated with the zones, and recreation features for the ecosection. Many of these units extend into Alberta, the northern states, and other parts of B. C. (Demarchi and Lea 1992). The geographic extent of these units is indicated. However, the descriptions apply only to ecosections or parts of ecosections that occur within the Kootenay-Boundary Region.

SOUTHERN INTERIOR MOUNTAINS ECOPROVINCE

Columbia Mountains and Highlands Ecoregion

Central Columbia Mountains Ecosection (CCM)

This ecosection extends from Meachen Creek and the west arm of Kootenay Lake, in the south, to Revelstoke, in the north, and from the upper Shuswap River, in the west, to the crest of the Purcell Mountains, in the east. This ecosection has high ridges with deep wide trenches and narrow valleys. Elevations range from 500 m in the valley bottoms to 2900 m on the highest peaks. The area covers the central Selkirk and the west central Purcell mountains. These mountains are commonly underlain by folded sedimentary and metamorphic rocks with granitic stocks and batholiths. Shallow to deep colluvial deposits intermixed with smaller areas of exposed bedrock and glaciers are the most common landforms. Less extensive deposits of moraine and glaciofluvial also occur. This area has relatively high precipitation.

The sequence of biogeoclimatic zones consist of low elevation Interior Cedar - Hemlock[3], mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. Seral stands include Douglas-fir, western larch, and hybrid white spruce at low elevations and lodgepole pine at higher elevations in the south. Avalanche tracks are common in upper elevation forests, start in alpine areas, and extend into upper to mid elevation forests. Alpine Tundra, the most extensive biogeoclimatic unit, is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, buttercups, saxifrages, sedges, grasses, and mountain-heathers.

Ospreys occur in high concentrations along the shores of Kootenay Lake. Early seral stands on low to mid elevation forests provide important forage for grizzly bear, but also support scattered populations of mule deer, white-tailed deer, moose, and elk. Extensive stands of high elevation old-growth forests support a range of wildlife species especially caribou, grizzly bear, and black bear. Elk, mule deer, and moose are also found in these forests. Vegetated areas in the Alpine Tundra provide habitat for mountain goat, wolverine, marten, White-tailed Ptarmigan, hoary marmot, and many species listed above for mid to high elevation forests.

This landscape is characterized by three main valleys with a rugged, mountainous landscape between each valley. The valleys contain Upper Arrow Lake, the Slocan River, and the North

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[3]The zone names reflect the climax tree species composition on average sites. The biogeoclimatic ecosystem classification system for British Columbia is described in detail in Meidinger and Pojar (1991).

Arm of Kootenay Lake. The main valleys are oriented north-south with subsidiary drainages flowing east or west. Recreational opportunities are concentrated in the valley bottoms, in the subalpine, and in the alpine. The forested hillsides adjacent to the main valley bottoms are an important scenic resource. Valley bottom opportunities and use are concentrated along five large, deep, cold, lakes and to a lesser extent along the major rivers. Activities include camping, boating, swimming, and fishing. In the subalpine and alpine areas, there are trails and opportunities for hiking, skiing, and mountaineering in a backcountry setting.

Eastern Purcell Mountains Ecosection (EPM)

This ecosection extends from the St. Mary River in the south to Oldman Creek, west of Golden in the north and from the crest of the Purcell Mountains in the west to the Rocky Mountain Trench in the east. The ecosection is a mountainous area with high valleys. Elevations range from 800 m in the valley bottoms to over 3400 m on the highest peaks. The area covers the eastern half of the Purcell Mountains. These mountains are underlain by folded sedimentary and metamorphic rocks with intrusions of granitic batholiths. Exposed bedrock and associated shallow to deep colluvium are the most common landforms. Glaciers are found on higher mountains in the central and northern part of the ecosection. Less extensive deposits of moraine and glaciofluvial are found on lower slopes. The ecosection occurs within a distinct rain shadow.

The most common sequence of biogeoclimatic zones consists of low elevation Interior Douglas-fir, mid elevation Montane Spruce, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. A few of the moister valleys have the Interior Cedar - Hemlock zone at lower elevations instead of Interior Douglas-fir or Montane Spruce zones. Seral stands include western larch, Douglas-fir, and lodgepole pine at low elevation, extensive lodgepole pine at mid elevation, and lodgepole pine and whitebark pine at high elevation. Alpine larch is often found in the subalpine parkland. Avalanche tracks are common in upper elevation forests, start in alpine areas, and extend into upper to mid elevation forest. The Alpine Tundra is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, mountain heathers, sedges, grasses, and other herbs.

Low to mid elevation forested habitats are important for elk, moose, grizzly bear, black bear, and white-tailed deer. High elevation forests support caribou, mule deer, marten, wolverine, Northern Hawk-Owl, and Red Crossbill. Parkland and lower areas of the Alpine Tundra provide habitat for

mountain goat, Golden Eagle, Rocky Mountain pika, Rock Ptarmigan, and most species listed above for mid to high elevation forests.

This rugged, spectacular landscape east of the Purcell Mountain divide, drains east into the Columbia and Kootenay Rivers. The valley orientation is east-west with many fast flowing rivers. Recreational opportunities are concentrated in valley bottom, subalpine, and alpine environments. In the valley bottoms, the recreational opportunities are adjacent to the rivers and streams. Activities include camping, hiking, big game hunting, horseback riding, and fishing. In the subalpine/alpine, the rugged, often glaciated terrain, is suitable for hiking and skiing. During the fall, hunting occurs as a widely dispersed activity. In the winter, the valley bottoms are extensively snowmobiled and alpine areas extensively heliskied.

McGillivray Range Ecosection (MCR)

In British Columbia, this ecosection extends from the international border in the south to Marysville in the north and from the Moyie River in the west to Gold Mountain in the east. The ecosection is lower with more subdued ridges than ecosections to the north and west. Elevations range from 800 m in the valley bottoms to over 2300 m on the highest peaks. This area covers the southeastern extension of the Purcell Mountains. These mountains are underlain by folded sedimentary and metamorphic rocks with minor volcanics. Morainal deposits of variable thickness are the most common landform. The next most frequent landforms are bedrock and associated colluvial deposits on steeper terrain. Less frequent glaciofluvial and active fluvial deposits occur in the northern half of the ecosection. The climate in this ecosection is transitional from the moister South Columbia Mountains in the west to the drier East Kootenay Trench Ecosection in the east.

The sequence of biogeoclimatic zones consists of low elevation Interior Douglas-fir, mid elevation Montane Spruce, and high elevation Engelmann Spruce - Subalpine Fir. Moister areas have the Interior Cedar - Hemlock zone at lower elevations instead of the Montane Spruce zone. Seral stands include western larch and lodgepole pine at low elevations, extensive lodgepole pine at mid elevation, and lodgepole pine plus whitebark pine at high elevations.

Warm aspect forests and early seral stages at low elevation provide habitat for mule deer, elk, and white-tailed deer. Floodplains, riparian areas, and young seral forests are important habitat for moose, white-tailed deer, grouse, black bear, mule deer, and elk at low to mid elevation. Mature coniferous forests at mid elevations support Pileated Woodpecker, Great Gray Owl, and

furbearers. High elevation seral forests near exposed ridges have populations of Blue Grouse. Seral forests with subalpine meadows support elk, mule deer, black bear, and red-tailed chipmunk.

The subdued and rounded summits are generally forested to the top. The main valley orientation is north-south, the Yahk and Moyie Rivers drain south, and the subsidiary valleys drain east or west. The recreational activities are dispersed, occur during all seasons, and include camping, fishing, cross-country skiing, snowmobiling, and hunting.

Northern Columbia Mountains Ecosection (NCM)

This ecosection extends from Duncan Lake and the Lardeau valley, in the south, to Slim Creek, in the Cariboo Mountains, in the north, and from Perry River, in the west, to the Beaver River valley and the Rocky Mountain Trench, in the east. The ecosection is an area of high ridges and mountains with many ice-capped peaks. The mountains are dissected by deep, narrow valleys and trenches. Elevations range from 500 m in the valley bottoms to over 3500 m on the highest peaks. In the Kootenay Region, this ecosection covers the northern Monashee, Selkirk, and Purcell Mountains. These mountains are underlain by metamorphic, sedimentary, and volcanic rocks. Shallow to deep colluvial deposits, bedrock, and glaciers are the most common landforms. Less extensive deposits of moraine, glaciofluvial, and recent fluvial occur at lower elevations. This area has the highest precipitation and the coldest temperatures in the Columbia Mountains and Highlands Ecoregion.

The most common sequence of biogeoclimatic zones consists of low to mid elevation Interior - Cedar Hemlock, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. In wetter areas, climax forests include mountain hemlock at mid to high elevations. Seral stands include hybrid white spruce, western white pine, and Douglas-fir at low elevation. Alpine Tundra, the largest biogeoclimatic unit, is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, mountain heathers, sedges, grasses, and other herbs.

At low elevations, young seral stands and riparian areas provide important habitat for moose, grizzly bear, black bear, elk, wolf, Osprey, and Bald Eagle. Low elevation old growth coniferous forests support caribou. Upper elevation forests and parkland habitats are utilized by caribou, grizzly bear, black bear, mule deer, and mountain goat.

This very rugged terrain is a scenic landscape. The main valley orientation is primarily north-south with the subsidiary drainages flowing east or west into the Columbia and Duncan Rivers. Most recreational opportunities are found in the valley bottoms, in the subalpine, or in the alpine. In the valley bottom, there are three reservoirs and one large lake which provide camping, boating, and fishing opportunities. In the upland areas, the numerous rugged peaks provide for hiking, viewing, skiing, and mountaineering opportunities. Large areas of alpine meadows are rare. Where these areas are accessible, they have trails which are used for hiking and horse-back riding. During the winter, heliskiing occurs extensively.

Southern Columbia Mountains Ecosection (SCM)

This ecosection extends from within Idaho and Montana, south of the international border, to Crawford Bay and the west arm of Kootenay Lake, in the north, and from the mouth of the Slocan River, in the west, to Moyie Lake, in the east. The ecosection has high ridges and mountains interspersed with wide valleys and trenches. It includes the southern half of Kootenay Lake and the Creston Valley. Elevations range from 500 m to over 2300 m. There are no glaciers in this part of the Columbia Mountains. This area covers the southern Selkirk and southwestern Purcell Mountains. It is more subdued and rounded than northern parts of these mountain ranges. Bedrock types include granitic batholiths, folded sedimentary rocks, and low grade metamorphic rocks. Shallow colluvium with associated bedrock are the most common landforms. Less extensive deposits of deep colluvium, moraine, and glaciofluvial occur at lower elevations. Minor deposits of recent fluvial occur around the larger rivers. Precipitation is high on mountain slopes.

The sequence of biogeoclimatic zones is low to mid elevation Interior Cedar - Hemlock and high elevation Engelmann Spruce - Subalpine Fir. High elevation Alpine Tundra occurs occasionally on some mountains. Seral stands include Douglas-fir, western larch, western white pine, and lodgepole pine at low to mid elevation, and lodgepole pine and whitebark pine at high elevations. Alpine larch occurs in the subalpine parkland and in the upper elevations of the Engelmann Spruce - Subalpine Fir zone. A unique feature of this ecosection is bear-grass as a dominant herb at mid to high elevation. The Alpine Tundra is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, buttercups, bear-grass, sedges, grasses, and mountain-heathers.

In the Creston Valley, the Kootenay River floodplain produces substantial numbers of diving and dabbling ducks, Western Grebe, Red-necked Grebe, Great Blue Heron, and Forster's Tern. The Creston Valley wetlands are also an important migratory staging area for the Canada Goose, Tundra Swan, and other waterfowl. The Coeur d'Alene Salamander, a species unique to this ecosection, occurs in riparian areas, wetlands, meadows, and floodplains in the dry and very dry parts of the Interior Cedar - Hemlock zone. Floodplain and riparian areas also have white-tailed deer, black bear, and grouse. Mid to high elevation forests provide habitat for mule deer, white-tailed deer, elk, and grouse. High elevation forests dissected by avalanche tracks support grizzly bear, black bear, elk, and caribou. Parkland areas have caribou, grouse, White-tailed Ptarmigan, and Columbian ground squirrel, while rugged warm aspects support mountain goat. The South Selkirk caribou herd is internationally significant. In Canada, the habitat for this species is limited to an area from the international border near Stagleap Park north to Porcupine Creek.

This landscape is dominated by steep to subdued and rounded mountains. The main valley is dominated by the Kootenay River and the West and South Arms of Kootenay Lake. Kootenay Lake provides year round recreation for boating, fishing, and camping. The area is very scenic and the hillsides adjacent to the main valleys are an important visual resource. Recreational opportunities are found at all elevations and occur all seasons. These include camping, viewing, hunting, fishing, skiing, and snowmobiling. Where accessible, skiing and snowmobiling occur in subalpine and alpine areas.

Northern Continental Divide Ecoregion

Border Ranges Ecosection (BRR)

This ecosection extends from Montana, south of the international border, to Elk Pass, in the north, and from the Bull River, west of Fernie, to the Oldman River valley in Alberta, in the east. The ecosection has wide valleys, subdued mountains, and occasional steep, rugged ridges. Elevations range from 800 m in the valley bottoms to 3200 m on the highest peaks. The area covers the northern portion of the Galton and MacDonald Ranges of the Border Ranges and the southern portion of the Front Ranges. These ranges are underlain by folded and faulted sedimentary rocks that include prominent bare ridges of limestone and major deposits of coal. Common landforms are bedrock outcrops, shallow to deep colluvial deposits, and shallow moraine. Lower elevations have deeper deposits of morainal and glaciofluvial origin. Significant deposits of recent fluvial materials are found in the valley bottoms of major rivers.

The most common sequence of biogeoclimatic zones consists of low elevation Montane Spruce, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. In the southern parts of the Bull, Elk, and Wigwam rivers, low elevation Interior Cedar - Hemlock occurs instead of Montane Spruce and climax stands are western redcedar and hybrid white spruce. Interior Douglas-fir is limited to low elevations in the driest parts of the ecosection. Seral stands at low elevation include extensive stands of lodgepole pine in the Montane Spruce; western larch, Douglas-fir, lodgepole pine, and aspen in the Interior Cedar - Hemlock; and lodgepole pine, ponderosa pine and western larch in the Interior Douglas-fir. Seral stands include lodgepole pine and western white pine at mid elevations and lodgepole pine and whitebark pine at high elevations. Subalpine, parkland sites may have alpine larch. Alpine Tundra, of limited extent in this ecosection, is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have meadows of grasses and shrubs.

Floodplains and riparian zones support elk, mule deer, white-tailed deer, grizzly bear, black bear, coyote, and Columbian ground squirrel. Higher elevation forests dissected by avalanche tracks have grizzly bear and elk. Above these forests, the collection zones for avalanches are utilized by mountain goats. High elevation grasslands are important for elk, bighorn sheep, and mule deer. Rugged, steep southerly aspects in the parkland areas are important for mountain goat, bighorn sheep, and grouse. Columbian ground squirrel, Golden Eagle, and red-tailed chipmunk are found on parkland meadows at higher elevations. Talus slopes have hoary marmot, Rock Ptarmigan, and pika.

This landscape, in the southern Rocky Mountains, is drained by the Elk, Wigwam, and Flathead Rivers. The valleys are oriented north-south. The main valleys are wide and the ridges between them vary from steep and rugged to subdued. Due to the less rugged nature of the landscape, recreational opportunities are wide-spread and occur during all seasons. The wide valleys offer river recreational opportunities such as camping, fishing, and boating. During the winter, the more remote valleys are extensively snowmobiled. The upland areas are an important scenic resource and provide opportunities for viewing, hunting, hiking, and skiing.

Crown of the Continent Ecosection (COC)

This ecosection is in the extreme southeast corner of the province. It occurs east of the Flathead River and extends into southern Alberta and Montana. The ecosection is a rugged, mountainous area that rises abruptly from the surrounding plains and basins. Elevations range from 1100 m in

the valley bottoms to over 2500 m on the highest peaks. The area covers the Clarke Range of the Border Ranges. This range is underlain by folded and faulted sedimentary and low grade metamorphic rocks. Prominent ridges are formed by resistant formations of limestone and sandstone. The major valleys are U-shaped glacial troughs. The most common landforms are bedrock outcrops and associated shallow deposits of colluvium and moraine. Deeper deposits of moraine and glaciofluvial materials occur at low elevations. Some recent fluvial deposits exist in proximity to major rivers. Compared to other areas of the Kootenay Region, the climate of this ecosection is relatively cool and dry with a short frost-free growing season.

The most common sequence of biogeoclimatic zones consists of low elevation Montane Spruce, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. Seral stands include lodgepole pine, Douglas-fir, and western larch at low elevations and lodgepole pine and whitebark pine at higher elevations. Subalpine, parkland sites may have alpine larch. Subalpine areas may also be characterized by provincially rare plant species. This includes Lyall's phacelia, Bolander's quillwort, slim larkspur, and subalpine buttercup. Alpine Tundra is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, mountain-heathers, mountain forget-me-not, subalpine fleabane, Sitka valerian, and sedges.

Fire origin, low elevation forests have early seral vegetation that provides good forage for mule deer, white-tailed deer, elk, moose, and grizzly bear. Windswept slopes and steep, rocky bluffs at mid to high elevations provide good habitat for bighorn sheep and mountain goats. Alpine meadows and avalanche tracks provide good summer habitat for elk, mule deer, and grizzly bear.

This rugged, spectacular landscape on the continental divide has several short creeks flowing west into the Flathead River. In British Columbia, this landscape is remote and not accessed by major transportation corridors. Most recreational opportunities occur in summer and include hiking, mountaineering, and hunting.

Selkirk - Bitterroot Foothills Ecoregion

Selkirk Foothills Ecosection (SFH)

This ecosection extends from within Washington and Idaho, south of the international border, to Monashee Pass, in the north, and from the upper part of the Kettle River, in the west, to the Salmo River valley, in the east. The ecosection is a subdued mountain area dissected by wide

valleys and trenches. The mountains have less relief than ranges to the north and east. Elevations range from 450 m in the valley bottoms to 2400 m on the highest peaks. The area covers the eastern Okanagan Highland and southern Selkirk Mountains. These mountains and highlands are underlain by folded sedimentary and metamorphic rocks, some volcanics, and granitic intrusives. Shallow and deep colluvial deposits and associated bedrock are the most common landforms. Less extensive deposits of moraine, glaciofluvial, and recent fluvials occur on lower slopes and valley bottoms. Rain shadows are common in the valleys around Castlegar and Trail.

The most common sequence of biogeoclimatic zones consists of low elevation Interior Cedar - Hemlock and mid to high elevation Engelmann Spruce - Subalpine Fir. High elevation Alpine Tundra occurs only on a few high ridges. The driest part of the ecosection has Interior Douglas-fir at low elevations near Lower Arrow Lake. Low elevations in this ecosection have the greatest diversity of tree species in British Columbia. Seral stands include western larch, Douglas-fir, lodgepole pine, western white pine, ponderosa pine, and, occasionally, grand fir on low to mid elevations and lodgepole pine at higher elevations. Subalpine, parkland sites may have alpine larch. The Alpine Tundra has extensive areas of willows, bear-grass, sedges, grasses, Sitka valerian, and mountain-heathers.

Floodplains, riparian areas, and lakes are important habitat for bird species including Osprey, Bald Eagle, and Great Blue Heron. Drier areas on low to mid elevations are utilized by mule deer, white-tailed deer, elk, and black bear. High elevation forested areas with interspersed avalanche tracks provide habitat for grizzly bear, black bear, elk, mule deer, moose, and caribou. Alpine parkland areas have caribou, grizzly bear, mule deer, elk, wolverine, and White-tailed Ptarmigan.

This landscape is drained by the Columbia (Lower Arrow Lake), the Granby, and the Salmo Rivers. The main valley orientation is north-south with the tributary valleys flowing east or west. Recreational opportunities in this hilly, forested landscape, occur at all elevations and throughout the year. In the valley bottoms, opportunities are concentrated on Christina and Arrow Lakes which provide for boating, swimming, and fishing. The Columbia River provides a long season for boating and fishing. The Granby River is popular for boating during high water. The upland areas are an attractive landscape and are valued for their scenic resource. These upland areas provide dispersed recreation during all seasons for camping, hiking, hunting, and snowmobiling. Accessible areas of the alpine are used for skiing and snowmobiling.

Southern Rocky Mountain Trench Ecoregion

Big Bend Trench Ecosection (BBT)

This ecosection extends in a northwest - southeast direction from Beavermouth Creek in the south to Encampment Creek in the north. The ecosection is a steep-sided trench. For most of the area, elevations range from 680 m at the surface of Kinbasket Reservoir to 1000 m on nearby highlands. The ecosection is located between the northern Selkirk Mountains and the Central Park Ranges of the Rocky Mountains. The reservoir covers much of the valley floor. The area is underlain by deep Quaternary sediments. The most common landforms are deposits of moraine, glaciofluvial, and glaciolacustrine. In the Kootenay region, this is the wettest part of the Rocky Mountain Trench.

Interior Cedar - Hemlock is the dominant zone. It has seral stands of hybrid white spruce, subalpine fir, and Douglas-fir.

Floodplain and riparian areas provide habitat for moose, elk, white-tailed deer, black bear, beaver, and wolf. These habitats are especially important because of the impact of the reservoir on this ecosection. Seral upland forests are utilized by grizzly bear, black bear, moose, and wolf.

The Kinbasket reservoir dominates the landscape and most of the upland is shoreline in nature. At the extreme south of the ecosection, there are upland areas away from the reservoir. The shoreline of the Kinbasket reservoir has limitations for recreation due to debris, limited access, and water fluctuation. At high water, camping, boating, and fishing are locally popular. At the south end, there are numerous small lakes which offer camping, boating, and fishing opportunities.

East Kootenay Trench Ecosection (EKT)

This ecosection extends from Flathead Lake, south of the international border, to Donald Station in the north. It is a broad, flat, glaciated valley floor lying between the Purcell Mountains to the west and the Rocky Mountains to the east. Elevations range from 700 m to 1100 m. A few taller ridges at the edge of the unit reach 1600 m. The area is underlain by deep Quaternary sediments. Moraine, glaciofluvial, and glaciolacustrine deposits are the most common landforms. The low gradient in the floor of the East Kootenay Trench has resulted in the rivers accumulating extensive floodplains of reworked glacial sediments.

The most common sequence of biogeoclimatic zones consists of low elevation Ponderosa Pine and Interior Douglas-fir in the southern half of the ecosection. Open stands of ponderosa pine, Douglas-fir, and grasses are common on dry, low elevation sites. Closed stands of Douglas-fir, lodgepole pine, and western larch are common at higher elevations. Low to mid elevation Montane Spruce is the most common biogeoclimatic zone in the northern half of the ecosection. In this area, the Interior Douglas-fir zone in valley bottoms is less extensive and Interior Cedar - Hemlock occurs at low elevation adjacent to the Dogtooth Range. The northern half of the ecosection has mixed seral stands of Douglas-fir and lodgepole pine at low to mid elevations. Seral stands of lodgepole pine and trembling aspen occur at higher elevations in this area.

This area is one of the most important wintering areas for ungulates in the province. Floodplains and riparian areas, including the Columbia River marshes, are important habitat for Great Blue Heron, waterfowl, elk, white-tailed deer, Osprey, mink, muskrat, black bear, gulls (fall migration), painted turtle, beaver, and Lewis' Woodpecker. Grasslands and seral shrublands are utilized by elk, white-tailed deer, mule deer, bighorn sheep, coyote, badger, grouse, Long-billed Curlew, and Prairie Falcon. Mature coniferous forests also have cougar, Pileated Woodpecker, White-breasted Nuthatch, Flammulated Owl, Northern Pygmy-owl, Clark's Nutcracker, and bobcat.

This broad, flat, intermountain plain is drained by the Kootenay and Columbia Rivers. It also has a few small lakes. The area offers tremendous diversity for outdoor recreation. Recreational activities occur during all seasons and throughout the entire landscape. Summers are long and warm, while winters are cool with little snowfall. In the north, the Columbia River and its adjacent marshes provide boating, viewing, bird watching, and hunting opportunities. Windermere and Columbia Lake are popular for swimming, boating, and windsurfing. The Kootenay River is less popular than the main lakes for most activities because of insect pests, limited access, and fewer recreational opportunities. In the south, the Lake Koocanusa reservoir and its shoreline are very popular and heavily used for camping, boating, and fishing. The small lakes in the upland areas offer camping, fishing, and some boating opportunities. The upland areas are popular for viewing, hiking, bicycling, and hunting.

Western Continental Ranges Ecoregion

Central Park Ranges Ecosection (CPK)

This ecosection extends from Mount Laussedat, in the south, to Hugh Allen Creek valley, in the north, and from the shore of Kinbasket Reservoir, in the west, to the North Saskatchewan River

valley in Banff National Park, in the east. The ecosection is an area of high, rugged mountains with many glaciers, icefields, and short steep-sided valleys. Elevations range from 600 m in the valley bottoms to 3300 m on the highest peaks. In the Kootenay Region, the area covers the central part of the Park Ranges in the Rocky Mountain system. These ranges are underlain by folded and faulted sedimentary and metamorphic rocks. The ridges are formed by resistant units of limestone and quartzite. Bedrock outcrops, shallow to deep deposits of colluvium, and thin moraine are the most common landforms. Less extensive deposits of deeper moraine and glaciofluvial occur in broad U-shaped valleys. Minor deposits of recent fluvial exist in valley bottoms of major rivers. The climate is cooler and moister than the adjacent Rocky Mountain Trench.

The most common sequence of biogeoclimatic zones consists of valley bottom Interior Cedar - Hemlock, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. Seral stands include lodgepole pine, western larch, and Douglas-fir at low elevations, lodgepole pine, Douglas-fir, and hybrid white spruce at mid elevations, and whitebark pine at high elevations. Alpine Tundra, the largest biogeoclimatic unit, is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, sedges, grasses, and Sitka valerian.

Floodplains, riparian areas, and avalanche tracks at low elevations provide habitat for moose, elk, grizzly bear, black bear, beaver, and wolf. Mature coniferous forests at mid to high elevations have wolverine and marten. Grizzly bear, black bear, and moose utilize avalanche tracks, seepage sites, and riparian areas at mid elevation. Mountain goats are found on rugged, southerly aspects of rock outcrops that occur below timberline.

This mountainous and glaciated landscape is remote, extremely rugged, and dissected by large, fast flowing rivers which drain into the Columbia River. It is very scenic. Recreational opportunities are concentrated in the valley bottoms or in the subalpine/alpine. Access is difficult; most recreation is summer oriented; and activities include viewing, camping, hiking, and mountaineering.

Southern Park Ranges Ecosection (SPK)

This ecosection extends from the Bull River valley, in the south, to the Blaeberry River, in the north, and from the Rocky Mountain Trench, in the west, to the Elk valley, in the east. The ecosection has rugged mountains dissected by long rivers with narrow valleys. Elevations range

from 1100 m in the valley bottoms to 3500 m on the highest peaks. It covers the southern portion of the Park Ranges of the Rocky Mountain system. These ranges are underlain by folded and faulted sedimentary and low-grade metamorphic rocks. The ridges are formed by resistant units of limestone and quartzite. The major river drainages occur in U-shaped glaciated valleys. Bedrock outcrops, shallow to deep deposits of colluvium, and thin moraine are the most common landforms. Less extensive deposits of deeper moraine occur at lower elevations. Larger river systems are eroding deep deposits of glaciofluvial and glaciolacustrine. The climate is cool and moderately dry, reflecting a strong continental influence.

The most common sequence of biogeoclimatic zones consists of low elevation Montane Spruce, mid to high elevation Engelmann Spruce - Subalpine Fir, and high elevation Alpine Tundra. Small areas of the Interior Douglas-fir zone occur in the driest valley bottoms. Seral stands include lodgepole pine, Douglas-fir, western larch, and trembling aspen at low elevations, lodgepole pine at mid elevations, and whitebark pine at high elevations. Subalpine parkland sites may have alpine larch. The Alpine tundra is dominated by rock, snow, and ice. Vegetated areas form a minor component of this zone and have willows, mountain-heather, broad-leaved willow herb, subalpine fleabane, and Sitka valerian.

Floodplains and riparian zones at low elevation support elk, moose, mule deer, white-tailed deer, grizzly bear, black bear, coyote, and Columbian ground squirrel. At higher elevations, floodplains and riparian areas are important habitat for moose, elk, white-tailed deer, black bear, and Ruffed Grouse. Higher elevation forests dissected by avalanche tracks have grizzly bear, elk, mule deer, and bighorn sheep. Above the forests, mountain goats utilize the accumulation zones for avalanches. Rugged, steep southerly aspects are important for mountain goat, bighorn sheep, mule deer, and grouse in the parkland and lower Alpine Tundra. Columbian ground squirrel, Golden Eagle, and red-tailed chipmunk are found on parkland meadows. Talus slopes have hoary marmot, Rock Ptarmigan, and pika.

This landscape is characterized by rugged mountains, long valleys in a north-west orientation, and fast flowing rivers that drain into the Kootenay and Columbia Rivers. Recreational activities are primarily summer oriented and occur in valley bottoms, subalpine, and alpine areas. The valley bottoms along rivers provide for high quality recreation including camping, canoeing, rafting, and fishing. The subalpine and alpine areas have very good opportunities for hiking, horseback riding, and mountaineering. Trail systems are extensive, particularly in National Parks, Provincial Parks, and Height of the Rockies Wilderness Area. During the fall, hunting occurs in all areas outside parks.

SOUTHERN INTERIOR ECOPROVINCE

Okanogan Highland Ecoregion[4]

Southern Okanogan Highland Ecosection (SOH)

This ecosection extends from Washington, south of the international border to the height of land north of Baker and McCarren Creeks. It has low, rounded ridges and wide valleys. Elevation ranges from 500 m in the lowlands to 1600 m on the northern ridges. The ecosection covers the southern part of the Okanagan Highland physiographic region. In this area, the highlands are underlain by granitic, metamorphic, sedimentary, and volcanic rocks. Moraine and glaciofluvial deposits are the most common landforms. Shallow to deep colluvial deposits and associated rock outcrops, on moderate to steep slopes, occur less frequently. Significant deposits of recent fluvial are found near major rivers and creeks. The valley bottoms are the hottest and driest in the Kootenay region. It is transitional between the dry Columbia Basin to the south in Washington and the moist Columbia Mountains to the east.

The most common sequence of biogeoclimatic zones consists of valley bottom Ponderosa Pine, low elevation Interior Douglas-fir, and mid to high elevation Montane Spruce. Open grasslands are more common than forested areas in the valley bottoms. Seral stands include ponderosa pine and Douglas-fir at lower elevations and Douglas-fir, western larch, and lodgepole pine at mid elevations. Lodgepole pine with minor Douglas-fir stands occur at higher elevations and are of limited extent in this ecosection.

Grasslands are important habitat for Brewer's Sparrow, badger, and Great Basin pocket mouse. Low elevation talus and rocky cliffs are important habitat for gopher snake, western rattlesnake, and the endangered Canyon Wren. An extensive fire history, at mid to higher elevations, has created seral habitat that supports mule deer, white-tailed deer, elk, and moose.

In British Columbia, this ecosection has an east-west orientation and is characterized by rounded forested hillsides on the north slopes and open grasslands on the south slopes. Much of this area is municipal or private land. Recreational opportunities are urban and rural in nature and are found in municipal and roadside parks. Outdoor recreational activities are bird-watching, viewing, and bicycling. The Kettle River has boating opportunities at high water.

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[4]The spelling used for this ecoregion reflects usage in the United States. This unit occurs more extensively south of the international border.

Thompson-Okanagan Plateau Ecoregion

Northern Okanagan Highland Ecosection (NOH)

This ecosection, in the Kootenay Region, extends from upper Rock Creek, in the south, to Copperkettle Lake, in the north, and from the regional boundary, in the west, to the Granby River, in the east. The ecosection is a rolling highland with wide, deep valleys. Elevations range from 500 m in valley bottoms to over 2100 m on the highest ridges The ecosection covers the east, central part of the Okanagan Highland physiographic region. In this area, the highlands are underlain by granitic rocks, gneissic metamorphic rock, clastic sedimentary, and mafic volcanic rocks. Moraine and glaciofluvial deposits, on valley bottoms and lower slopes, are the most common landforms. Colluvial deposits of variable depths and associated bedrock outcrops are less extensive. Recent fluvial deposits are found near the Kettle River and tributary creek bottoms. The ecosection is a cool, moist, transitional area between the dry, hot Okanagan Basin to the west and the wetter Columbia Mountains to the east.

The most common sequence of biogeoclimatic zones consists of lower elevation Interior Douglas-fir, mid elevation Montane Spruce, and high elevation Engelmann Spruce - Subalpine Fir. Seral stands include Douglas-fir, western larch, lodgepole pine, and ponderosa pine at low elevations and extensive stands of lodgepole pine with some Douglas-fir at mid to higher elevations.

Extensive fire history, at all elevations, has created seral habitats that support mule deer, white-tailed deer, moose, Williamson's Sapsucker, and Flammulated Owls.

The Okanagan Highlands have rounded ridges with gentle open slopes on the south sides. The main valleys are oriented north-south. The area is drained by the Kettle and Boundary Rivers. In the valley bottoms along the rivers, there are camping and fishing opportunities. Boating occurs in the spring when rivers have high water levels. The upland plateau contains many small lakes which provide camping and fishing opportunities. In the fall, hunting takes place throughout the area. During the winter, snowmobiling and skiing are popular.

REFERENCES

Braumandl, T. F. and M. P. Curran. 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B. C. Min. For., Land Manage. Handb. No. 20, Victoria, B. C.

Demarchi, D. A. 1986. Biophysical resources of the East Kootenay area: wildlife. B. C. Min. Environ., MOE Tech. Rep. No. 22, Victoria, B. C.

Demarchi, D. A. 1993. Ecoregions of British Columbia. Map legend plus explanatory notes on Ecoregion Classification System. B. C. Min. Environ., Lands and Parks, Victoria, B. C.

Demarchi, D. A., R. D. Marsh, A. P. Harcombe, and E. C. Lea. 1990. The environment (of British Columbia). *In* The birds of British Columbia, Vol. 1. R. W. Campbell, N. K. Dawes , I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, and C. E. McNazz (eds.). Royal British Columbia Museum, Victoria, B. C. pp. 55-142.

Demarchi, D. A. and E. C. Lea. 1992. Regional and zonal ecosystems in the Shining Mountains. Map and attached legend. B.C. Min. Environ., Lands and Parks, Wildlife Branch and Montana Dep. Fish, Wildlife and Parks, Printed in Victoria, B. C.

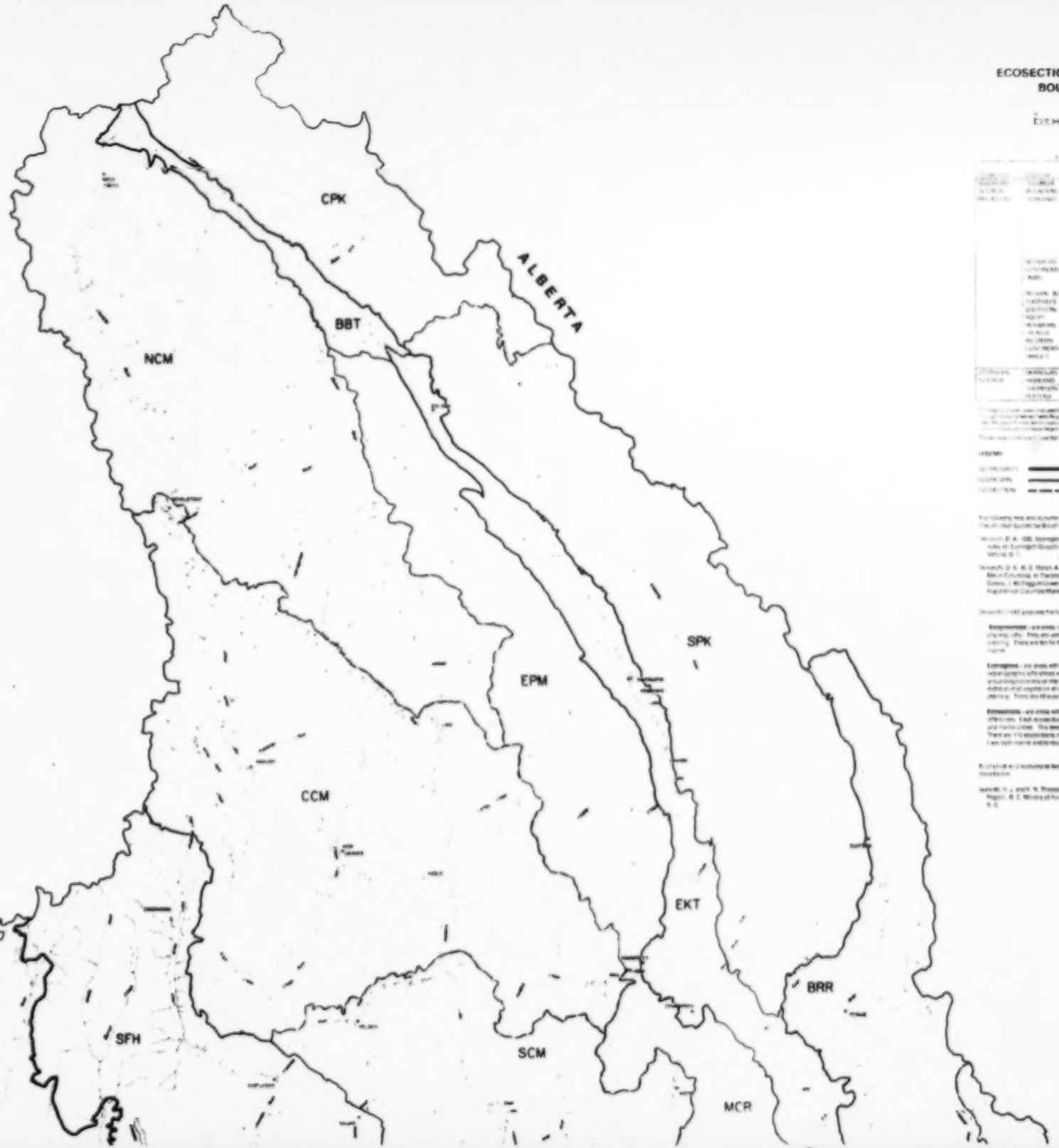
Demarchi, D. A. (compiler) and K. T. Lewis. 1992. Synopsis of the ecoregion classification system of British Columbia. Appendix 3 *In* K. Lewis and A. MacKinnon (compilers and editors). 1992. Gap analysis of B. C.'s protected areas by biogeoclimatic and ecoregion units. B. C. Min. Environ., Lands, and Parks and Min. For., Victoria, B. C.

Fenger, M., T. Lea, and A. Stewart. 1989. Regional wildlife habitat maps for East and West Kootenays. Map plus legend with detailed unit descriptions. B. C. Min. Environ., Wildlife Branch, Victoria, B. C.

Holland, S. S. 1976. Landforms of British Columbia - a physiographic outline. B. C. Dep. Mines and Petroleum Resources, Bull. No. 48, Victoria, B. C.

Jungen, J. R. 1980. Soil resources of the Nelson map area. Rep. No. 28 of the British Columbia Soil Survey, B. C. Min. Environ., RAB Bull. No. 20, Kelowna, B. C. .

Kowall, R. C. 1980. Soil and terrain of the Seymour Arm area (N. T. S. Map 82M). Rep. No. 16 of the British Columbia Soil Survey, B. C. Min. Environ., RAB Bull. No. 19, Kelowna, B. C.



ECOSECTIONS OF THE KOOTENAY-BOUNDARY REGION

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Lacelle, L. E. H. 1990. Biophysical resources of the East Kootenay area: soils. Rep. No. 20 of the British Columbia Soil Survey, B. C. Min. Environ., Wildlife Tech. Monograph TM-1, Victoria, B. C.

Lea, E. C. 1984. Biophysical resources of the East Kootenay area: vegetation. B. C. Min. Environ., MOE Tech. Rep. No. 5 (Volumes 1 and 2), Victoria, B. C.

Lewis, K., and A. MacKinnon (compilers and editors). 1992. Gap analysis of B. C.'s protected areas by biogeoclimatic and ecoregion units. B. C. Min. Environ., Lands, and Parks and Min. For., Victoria, B. C. Includes 3 appendices.

Meidinger, D., and J. Pojar (compilers and editors). 1991. Ecosystems of British Columbia. B. C. Min. For., Special Rep. Series No. 6, Victoria, B. C.

Ryder, J. M. 1981. Biophysical resources of the East Kootenay area: terrain. B. C. Min. Environ., APD Bull. No. 7, Victoria, B. C.

Valentine, K. W. G., P. N. Sprout, T. E. Baker, and L. M. Lavkulich (editors). 1978. The soil landscapes of British Columbia. B.C. Min. Environ., Resource Analysis Branch, Victoria, B.C.

Wittneben, U. 1980. Soil resources of the Lardeau map area (82K). Rep. No. 27 of the British Columbia Soil Survey, B.C. Min. Environ., RAB Bull. No. 15, Kelowna, B. C.